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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,837	06/29/2006	Tuan Quoc Ly	29610/CDT386	3759
4743 7590 07/16/2010 MARSHALL, GERSTEIN & BORUN LLP 233 SOUTH WACKER DRIVE 6300 WILLIS TOWER CHICAGO, IL 60606-6357			EXAMINER MABRY, JOHN	
			ART UNIT 1625	PAPER NUMBER
			MAIL DATE 07/16/2010	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/549,837

Applicant(s)

LY, TUAN QUOC

Examiner

JOHN MABRY

Art Unit

1625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 April 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/GS/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Response to Applicant's Remarks

Applicant's response on April 15, 2010 filed in response to the Office Action dated October 15, 2010 has been received and duly noted.

In view of this response, the status of the rejections/objections of record is as follows:

Status of the Claims

Claims 1-13 and 15-17 are pending and rejected.

Claim 14 has been cancelled.

Applicant's Response to Restriction Requirement

Applicant's response on March 24, 2008 filed in response to the Election/Restriction dated January 24, 2008 has been received and duly noted. The Examiner acknowledges Applicant's election of

Ir(ppy)_3 as the metal complex of formula $\text{M}(\text{Ar}^1\text{Ar}^2)_n\text{L}$; phenyl pyridine as the bidentate ligand L; and, $[\text{Ir(ppy)}_3\text{Cl}]_2$ as the compound of Formula I, with traverse.

with traverse. Examiner properly addressed Applicant's traversal and made the restriction final in Non-Final Office Action dated June 5, 2008. Examiner's search of was limited to Applicant's election only.

35 USC § 112 Rejection(s)

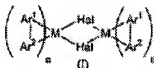
Rejection of claim 13 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention is maintained (see previous rejection below).

The term "metal complex" in claim 13-14 is renders the claim indefinite. The term "metal complex" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. There are infinite numbers of possibilities of metal complexes. Claim 1 recites the limitation "metal complex of $M(Ar_1Ar_2)_nL$ ".

Applicant argues that the term "metal complex" is understood by one of ordinary skill in the art where reference by Shiver et al is used as support. Applicant has not provided the reference; therefore, Examiner cannot consider reference. The Specification does not provide any definition for this term.

Applicant also argues that the metal complex end product of claim 13 is defined in the claim. Examiner disagrees. For example, in claim 1, Applicant clearly defines the end product regarding the term "metal complex" where metal complex is of Formula $M(Ar^1Ar^2)_nL$ and compound of Formula I is labeled as compound of Formula I – see below:

1. (Currently amended) A method of forming a metal complex of formula $M(Ar^1Ar^2)_nL$ comprising the step of reacting a compound of formula (I) with a bidentate ligand L:



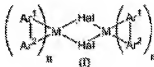
wherein Ar^1 and Ar^2 are each independently an optionally substituted aryl or heteroaryl; Ar^1-Ar^2 forms at least one carbon-M bond by reaction of M with a carbanion of Ar^1-Ar^2 ; L is a compound of formula Ar^1-Ar^2 which forms at least one carbon-M bond by reaction of M with a carbanion thereof; M is iridium, rhodium, platinum or palladium; Hal is a halogen; and n is a number from 1-[[3]]2 having a value necessary to satisfy the valency of metal M,

in the presence of an enabling ligand that is capable of breaking the halogen bridge of the compound of formula (I).

In claim 13, a "metal complex" is described. What metal complex? Does Applicant intend for the metal complex to be Formula $M(Ar^1Ar^2)_nL$ as described in claim 1.

13. (Currently amended) A method of forming a metal complex comprising:

a) a first step of reacting a compound of formula $M(\text{Hal})_m$ with a compound of formula $\text{Ar}^1\text{-Ar}^2$ to form a compound of formula (I):



and

b) a second step of reacting the compound of formula (I) with a reactive ligand that is capable of breaking the halogen bridge of the compound of formula (I),

wherein Ar^1 and Ar^2 are each independently an optionally substituted aryl or heteroaryl; $\text{Ar}^1\text{-Ar}^2$ forms at least one carbon-M bond by reaction of M with a carbanion of $\text{Ar}^1\text{-Ar}^2$; M is iridium, rhodium, platinum or palladium; Hal is a halogen; m is a number from 2-8 and n is a number from 1-[[3]]2, m and n each having a value necessary to satisfy the valency of metal M,

wherein the first and second steps are performed in a one-pot process.

In chemistry, a metal complex, is a structure consisting of a central atom or ion (usually metallic), bonded to a surrounding array of molecules or anions (ligands, complexing agents) - IUPAC 1994, 66, 1077. According to this definition, regarding the term "metal complex" in claim 13, Examiner could interpret this definition to be: Formula I, Formula $M(\text{Ar}^1\text{Ar}^2)_n\text{L}$ or $M(\text{Hal})_m$.

The 112-1st rejection of claims 1-13 and 15-17 regarding the scope of enablement for "Ar1, Ar2, L" not being enabled for all aryl and heteroaryl compounds in complexes claimed and not being enabled for forming complexes involving all "M"

(metals as claimed). These rejections have not been overcome in view of Applicants arguments. As described in previous Non-Final Office Action, Ar1, Ar2 and L are not enabled to be all aryl and heteroaryl compounds.

Applicant arguments that the instant application is enabled for Ar1 and Ar2 are enabled for all claimed heteroaryl and aryl moiety. Examiner respectfully disagrees.

Due to lack of definitions in the Specification for the terms heteroaryl and aryl, the Examiner has to use the broadest reasonable interpretation of those terms. As communicated in Final Rejection dated 1/30/09:

The 112-1st rejection of claims 1-4 and 6-17 regarding the scope of enablement for "Ar1, Ar2, L and M" have not been overcome in view of Applicants arguments. As

described in previous Non-Final Office Action, Ar1, Ar2 and L and M are not enabled to be all aryl and heteroaryl compounds and all metals as claimed, respectively.

Applicants have argued that the term "aryl and heteroaryl" are well-established terms of art pertaining to claimed invention. This is not persuasive because there are inconsistent and differing uses of the word "aryl and heteroaryl" in the art. The widely used "Condensed Chemical Dictionary" states that the term heteroaryl means - designating a closed-ring structure, usually of either 5 or 6 members, in which one or more of the atoms in the ring is replaced with sulfur or nitrogen (see page 566 - the term "heteroaromatic" references the term "heterocyclic", so Examiner will use the definition of heterocyclic with the term heteroaryl). The widely used textbook "Organic Chemistry" by Fessenden says on page 451 that the compounds must be aromatic but that any and all atoms in the ring may be selected from the entire periodic table, not just selected from sulfur or nitrogen. The less widely used textbook "Introduction to Organic Chemistry" by Streitwieser on page 1061 defines "heterocycles" as both aromatic and nonaromatic. It further implies that the nitrogen, oxygen and sulfur atoms are commonly meant and that any size ring falls under the rubric of the word. A similar rationale can be used for the term "aryl".

The Board of Patent Appeals and Interferences held, and the court affirmed *in re* Hawkins 179 USPQ 421 that "It must also be noted that the claim terminology is so broad that it does not even require that the heterocyclic group contain a carbon atom. Heterocyclic ring systems containing phosphorus, boron, silicon and other elements in addition to nitrogen and oxygen without the inclusion of carbon atoms are well-known

and could not be expected to produce compounds having the properties herein claimed." Applicant is clearly not enabled for the full scope of the terms "aryl and heteroaryl" as universally defined.

Additionally, Applicant has not provided sufficient guidance in the Experimental for one of ordinary in the art to take any aryl and/or heteroaryl group and incorporate it into Applicant's invention. As stated in previous Action, Applicant has only provided guidance where Ar1-Ar2 are phenyl-pyridinyl. In regards to Applicant's request for clarification, Examiner means that Applicant is enabled for Ar1, Ar2 and L being pyridinyl and phenyl, M being Ir and not enabled when Ar1, Ar2 and L are different. For example, Applicant has not provided guidance when (Ar1-Ar2)_n, where n=3 to be phenyl-phenyl, phenyl-pyridinyl and pyridinyl-pyridinyl.

Applicant has provided a few metal complexes were heteroaryl and aryl moieties are outside what Applicant is enabled; however, these few examples does overcome Applicant's lack of enablement for all claimed heteroaryl and aryl moieties. Additionally, Examiner acknowledges Applicant's election of the following:

$\text{Ir}(\text{ppy})_3$ as the metal complex of formula $\text{M}(\text{Ar}^1\text{Ar}^2)_n\text{L}$; phenyl pyridine as the bidentate ligand L; and, $[\text{Ir}(\text{ppy})_2\text{Cl}]_2$ as the compound of Formula I, with traverse.

Examiner's search reflects Applicant's election and prior art has been applied reflecting the elected group.

As previously communicated, Applicant is not enabled for metal complexes where M=rhodium, platinum or palladium with the full scope of the Ar1-Ar2 and L moieties claimed. According to the Specification, Applicant has only provided guidance to make claimed complexes where M=Ir, Ar1-Ar2 =phenyl-pyridinyl where phenyl and

pyridinyl has very few substituents. Due to the lack of guidance, it would present an undue burden to an artisan of ordinary skill of the art to execute claimed invention.

The scope of enablement for $n=3$ has been overcome in view of Applicant amending n to only being 1 and 2.

Claim Rejections - 35 USC § 102

Claims 1, 2, 5, 8, 10-15 and 17 rejected under 35 U.S.C. 102 (a) and (e) as being anticipated by Tsuboyama et al (EP 1,239,526 A1) (PTO-1449);

rejected under 35 U.S.C. 102 (e) as being anticipated by Kamatani et al (EP 1,349,435 A1) (PTO-1449);

rejected under 35 U.S.C. 102 (b) as being anticipated by Lamansky et al (Inorg. Chem. 2001, 40, 1704-1711) (PTO-1449) and

rejected under 35 U.S.C. 102 (b) as being anticipated by anticipated by Lamansky et al (WO 02/15645 A1) (PTO-1449) have all been withdrawn.

Claim Rejections - 35 USC § 103

Rejections of claims 1-5 and 8-17 under 35 U.S.C. 103(a) as being unpatentable over Kamatani (EP 1,349,435) and claims 1-17 under 35 U.S.C. 103(a) as being unpatentable over Lamansky et al (WO 02/15645 A1) (PTO-1449) are maintained.

Applicant argues that it would not have been obvious for one of ordinary skill in the art to decrease the number of synthetic steps and interchange solvents and bases

in order to achieve claimed methods. Examiner respectfully disagrees with Applicant's assertion.

The adjustment of particular conventional working conditions (e.g. determining result effective amounts of the ingredients beneficially taught by the cited references), as well as adjustment of reaction temperature, reaction time and use of solvents, rearranging steps in a reaction sequence, is deemed merely a matter of judicious selection and routine optimization which is well within the purview of the skilled artisan (*In re Mostovych*, Weber, Mitchell and Aulbach, 144 USPQ 38). Accordingly, these types of modifications would have been well within the purview of the skilled artisan and no more than an effort to optimize results.

It is well within the purview of the skilled artisan in the relevant art to reduce steps in order to achieve the desired product faster and in higher yields.

Dorwald clearly states that in the design of a molecule, a synthetic chemist would need to analyze *"the shortest synthetic strategies which are most likely to give rapid access to the target compound, ideally in high yield and purity"* - see page 2 under 1.2 Synthesis Design.

Dorwald does not mention the specific metal complexes as claimed, but Examiner maintains that an artisan of ordinary skill, in this case, an organic chemist, would be motivated to take the prior art of record and reduce the steps in order to achieve the final product for improved efficiency. Improved synthetic efficiency can lead

to lower financial costs due to, for example, less solvents used, less undesired side products made, less man hours, etc. which is also more environmentally friendly.

The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in KSR noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Court quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), stated that "[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." KSR, 550 U.S. at ___, 82 USPQ2d at 1396. Exemplary rationales that may support a conclusion of obviousness include:

- (A) Combining prior art elements according to known methods to yield predictable results;
- (B) Simple substitution of one known element for another to obtain predictable results;
- (C) Use of known technique to improve similar devices (methods, or products) in the same way;
- (D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- (E) "Obvious to try" – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

- (F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- (G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. See MPEP § 2143 for a discussion of the rationales listed above along with examples illustrating how the cited rationales may be used to support a finding of obviousness. See also MPEP § 2144- §2144.09 for additional guidance regarding support for obviousness determinations.

The aforementioned reasons above describe rationales that support a conclusion of obviousness based upon the KSR International Co. v. Teleflex Inc. decision.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Mabry, PhD whose telephone number is (571) 270-1967. The examiner can normally be reached on M-F from 9am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the Examiner's primary examiner can be reached at (571) 272-0684, first, or the Examiner's supervisor, Janet Andres, PhD, can be reached at (571) 272-0867. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/John Mabry/
Examiner
Art Unit 1625

/Rita J. Desai/
Primary Examiner, Art Unit 1625